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## Infrastructure

### DC at Center of Power Debate

By [Jeffrey Burt](#)  
September 12, 2006

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ORLANDO, Fla.—The idea of using DC power distribution throughout the data center as a way of saving on power and cooling costs continues to gain headway.

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At the Data Center World conference here Sept. 11, an official with EYP Mission Critical Facilities—an engineering firm that includes data centers among its specialties—told more than 100 attendees that DC power is a better alternative to traditional AC power distribution methods.

"DC[-powered] servers are 20 to 30 percent more efficient," said Kfir Godrich, director of technology development for New York-based EYP. "There is a 20 percent space efficiency [on the data center floor] in DC versus AC."

However, while some data center administrators appear willing to at least give DC power a look, some technology vendors and data center engineers question whether the advantages are as clear as proponents suggest.

High-voltage DC systems need large copper cables, which can be expensive, and DC power still isn't as easy to transport as AC power, according to Juan Orosco, engineering team leader with Rosendin Electric, a San Jose, Calif.,

company that helps design and build data centers.

"It's another idea, but I don't know if it's a better idea," Orosco said.

In addition, points where AC systems are accused of being inefficient, such as in the UPS (uninterruptible power supply)—a battery backup in AC systems—are becoming more efficient, said Steve Carlini, director of product management for American Power Conversion, in Kingston, R.I.




 **Engineers demonstrate how DC power in the data center can save on energy consumption and cost. [Click here to read more.](#)**

"A lot of the [inefficiencies] that they talk about in studies don't exist anymore," Carlini said. DC proponents talk about 75 percent efficiencies in UPS, but with new products hitting the market, that number is up past 90 percent, he said.

**Power and cooling costs** have become top issues for data center managers having to deal with the increasing densities in computing products—from servers to storage devices—and the rapidly rising cost of energy. Where racks of servers once consumed 7 to 10 kilowatts of power, with such form factors as blade servers, those numbers can climb to 15kw or more, and that number will continue to climb, said EYP's Godrich. Projects are under way in the high-performance computing field that could push it to up to 60kw per rack.

That is causing businesses to look at alternatives in the data center, everything from liquid cooling devices to DC power distribution. Lori Nelson, data center manager for Wright Express, in South Portland, Maine, said power and

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cooling are key issues for her company, which offers payment processing and information management services to the vehicle fleet industry. In the summer of 2005, Wright sustained three different failures due to heat.

While the company has a traditional AC power system set up now, "we continue to take a look at everything that is out there," said Nelson, who was attending the AFCOM-hosted show here.

In traditional data centers, AC power comes in from an outside source and, once inside, is converted multiple times back and forth with DC before finally reaching the servers, which run on DC. It's at those conversion points where electricity is lost and heat is generated. Keeping the entire system within the data center on DC power would be more efficient, according to DC proponents.

Still, AC power has such advantages as ease of transportation. It also doesn't need huge batteries for backup, Orosco said. "Batteries are a big problem," he said. "If you have a big DC plant, you need a big battery plant."



[Click here to read more about the use of DC power in the data center.](#)

However, some companies—such as Pentadyne and Active Power—are interested in using flywheel technology as an alternative to batteries.

A group of engineers at the Lawrence Berkeley National Laboratory, in a **proof-of-concept project** backed by such technology vendors as Sun Microsystems, Intel and Advanced Micro Device, in August said that DC power distribution can save up to 15 percent or more on energy consumption and cost.

In addition, server maker Rackable Systems is finding that its DC power-based hardware products increasingly are accounting for a larger share of its revenues. In the second quarter, about half of the Milpitas, Calif., company's \$88.6 million in revenue came from the DC power line.

EYP's Godrich admitted that there has yet to be a major data center project that relies primarily on DC power. The Berkeley lab engineers say the next step in their project is to try to find a major company that would commit to setting aside some or all of its data center for DC power.

However, people like APC's Carlini and Arun Kamath, IT infrastructure consultant for Fusion Infotek, of Westmont, Ill., say that what's needed is not the adoption of DC power, but improvements in what is currently being done. Carlini said bringing AC power in at 400 volts and keeping it there throughout the data center—rather than converting it to 208v and 120V—would remove most of those troublesome conversion points.

Kamath said being more efficient in how data centers are designed—he has a system where he groups like servers, such as low-end x86 blades in one place and larger Sun servers in another, and gives them air cooling sufficient for their needs—would reduce power and cooling costs more than switching to DC power.

Both he and Rosendin's Orosco say they occasionally are asked by clients about using DC power throughout the data center but have not yet had a client who pursued it.



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